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Transportation and Land Use Technical Work Group

Summary List of Draft Priority Policy Options for Analysis

Option No.	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2008–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Level of Support
		2012	2020	Total 2008–2020			
TLU-1	Carbon Tax via fuel ($0.15 > $2.00/gal)	0.8	2.5	TBD	TBD	TBD	Pending
TLU-2	Land Use and Location Efficiency	2.5	7.5	48.6	TBD	TBD	Pending
TLU-3	Transit	1.1	1.7	TBD	TBD	TBD	Pending
TLU-4	Low Greenhouse Gas Fuel Standard	3.25	3.8	TBD	TBD	TBD	Pending
TLU-5	Intercity Travel: Aviation, High Speed Train, Bus	TBD	TBD	TBD	TBD	TBD	Pending
TLU-6	Pay-as-you-Drive Insurance	1.0	4.3	TBD	TBD	TBD	Pending
TLU-7	VMT Budgets	TBD		TBD	TBD	TBD	Pending
TLU-8	Bike and Pedestrian Infrastructure	TBD	TBD	TBD	TBD	TBD	Pending
TLU-9	Pricing Measures	TBD	TBD	TBD	TBD	TBD	Pending
	Commuter Choice	0.1	0.2	TBD	TBD	TBD	Pending
	Mileage charge	TBD	TBD	TBD	TBD	TBD	Pending
TLU-10	Off-Road Engines/Vehicles	0.7	0.8	TBD	TBD	TBD	Pending
TLU-11	Evaluate the GHG Emissions Impacts of Major Projects	TBD	TBD	TBD	TBD	TBD	Pending
	Sector Total After Adjusting for Overlaps	TBD	TBD	TBD	TBD	TBD	
	Reductions From Recent Actions	TBD	TBD	TBD	TBD	TBD	
	Sector Total Plus Recent Actions	TBD	TBD	TBD	TBD	TBD	

TLU-1 Carbon Fuel Tax

Policy Description

Establish an incremental fuel tax whose revenue would fund transportation investments and operations that reduce GHG emissions. The GHG performance of these and other transportation investments would be closely evaluated before being made, and closely tracked afterwards with performance-based contracts ensuring timely GHG reductions. The magnitude of GHG emission reduction will be greater if regional implementation can be coordinated.

Amount levied to be determined

- Small amounts (~15 cents) can have some demand impact, but can be more appropriately seen as a way to fund transportation related policies than to reduce consumption and emissions directly.
- Larger amounts can have a more meaningful direct impact on consumption and emissions. Revenue can still be used to fund transportation-related policies, but can also be used to reduce other taxes and fees.

Policy Design

Goals:

- Gas tax phased towards carbon tax that increases over time. Start with $0.15 per gallon tax that will increase to $2.00 per gallon by 2025.
- Increase the state tax on conventional fuels to raise revenues for funding transit and other transportation alternatives, options other than single occupant driving.
- Reflect some of the health and environmental (especially GHG) costs of carbon combustion in the fuel being sold, and by reflecting the costs of combustion, thereby reduce the growth in combustion

Timing: 2008 Legislative Session.

Parties Involved: automobile users, state departments of commerce, transportation, revenue, finance.

Other:

Implementation Mechanisms

To implement the multimodal transit elements of this policy,

- State, regional, and local transit plans are to be developed
- Funding gaps that exist to implement these plans should be assessed
- Proportion of gap that would be covered by the gas tax levied should be determined
- Governor should create interagency group to identify ways to reduce GHGs and develop resource allocation strategy to recognize different regional needs

Related Policies/Programs in Place

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Types(s) of GHG Reductions

CO2, methane, and carbon black

Estimated GHG Reductions and Net Costs or Cost Savings

The forecast effect of this policy turns on two calculations:

1. the elasticity of demand for fuel with respect to price, and
2. the responsiveness to VMT to investments in reducing VMT.

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:**

1. For this round, and in response to recent data showing a low gas demand elasticity, we use an elasticity of 0.1.
2. The major effect comes from investing the revenue from the tax in projects that reduce VMT.

For example, in 2012, a gas tax that increased smoothly from $0.15 in 2008 to $2.00 in 2020 would reduce demand directly by about 0.8 $MMtCO_2e$ in 2012. It would also raise (@$0.77/gal) about $2.8 billion/year in 2012. The most cost-effective VMT-reducing Commuter Choice programs in the country are in the DC region, reducing VMT at ~1-2 cents/VMT. Such a program can effectively invest much more than its current budget, but almost certainly not $2.8 billion. The rest would go into finding transit and similar types of projects, whose impacts are quantified in TLU-3.

The TWG needs to advise on an investment split between commuter benefits programs and transit; once it does so, the reductions associated with this option will increase.

- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-2 Land Use and Location Efficiency

Policy Description

Implement land use planning and development strategies that reduce the number of vehicle miles traveled and corresponding greenhouse gas emissions. Strategies include adopting statewide growth management plans and planning process that encourage more compact development, transit-oriented development and other tools which encourage people to drive fewer miles.

Policy Design

Goals:

To return statewide VMT to 1990 per capita levels by 2020 by implementing policies that maximize growth management and incentivize GHG emissions reductions in the following areas:

1. Land use planning and regulation policies,
2. Development and housing policies that shape public and private investment, and
3. Transportation policies.

- **Timing:**
- **Parties Involved:**

Other: the 1990 benchmark in Maryland is 8,480 miles traveled per capita based on a 1990 population of 4.78 million and 1990 VMT of 40,540 million miles. The comparable statistics for 2005 are 10,200 miles per capita based on a 2005 population of 5.56 million and 2005 VMT of 56,725 million miles. 2020 projections estimate VMT per capita in Maryland in that year of 11,519. Therefore, the needed VMT per capita reduction in Maryland from 2020 business-as-usual estimates to reach 1990 levels is a 26 percent.

Implementation Mechanisms

Strategies and mechanisms are detailed for the 3 policies outlined under policy design.

1. *Land use planning and regulation policies*
    a. Require climate-friendly compact growth and integrated transportation/land use planning
        i. Adopt statewide development plan that includes a GHG emissions cap for regional transportation & land use plans/programs.
        ii. Develop GHG budgets and VMT per capita targets for local, county, regional and state land use and infrastructure plans.

iii. Develop a mechanism for coordinating with and comparing local and county land use and infrastructure plans with the statewide growth management plan to ensure consistency and compatibility.

iv. Provide underlying data/resources to local jurisdictions to implement i – iii.

b. Require local comprehensive plans and environmental impact statements to run local transportation plans against land use plans and then include global warming emissions analysis and reduction policies.

c. Direct state spending (including sewer and water) to communities that adopt land use planning and regulation best practices that meet the GHG budget and VMT performance standards set.

d. Require and support zoning for smart growth

e. Protect open space to absorb CO_2 and concentrate development in existing areas

2. Development and housing policies that shape public and private investment so as to maximize growth management and incentivize GHG emission reductions

a. Create smart location requirements and incentives for developers, business and homeowners to maximize growth management and concurrent reductions in GHG emissions.

b. Strengthen cities, towns and villages by creating and expanding tax incentives for redevelopment and infill development

c. Fund the reform of state and local tax and zoning/building codes and policies to support and incentivize maximum growth management and GHG emission reductions.

3. Transportation policies that

a. Sets targets for VMT in line with the overall goal of returning statewide VMT to 1990 per capita levels by 2020 and develop more effective VMT measurement.

b. Prioritize funds for new transit and significantly expand and improve existing transit systems to provide alternatives to single occupancy vehicular travel.

c. Prioritize funds for preservation and management ahead of capital/capacity expansion for roadway projects.

4. Develop appropriate enforcement policies to ensure that the plans are followed through with and goals are met.

Related Policies/Programs in Place

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Types(s) of GHG Reductions

Primarily CO2

Estimated GHG Reductions and Net Costs or Cost Savings

Current reductions assume a return to 1990 per capita VMT in 2020: a 26% reduction from BAU 2020 VMT. All else is held constant.

- **Data Sources:** CCS inventory and forecast
- **Quantification Methods:** Top-down
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

There is currently substantial discussion in the TWG about whether land use and location efficiency can produce these kinds of gains.

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-3 Transit

Policy Description

Shift passenger transportation mode choice to increase transit ridership and carpooling. This strategy will reduce GHG emissions by reducing vehicle miles traveled (fewer vehicle trips). Ensure that transportation is integrated with and appropriately serves land use development plans (developed under TLU-02).

Policy Design

Goals: To achieve a 10% reduction in the number of commute trips statewide by 2020.

1. Improve transit service and expand transit infrastructure (rail, bus)
2. Focus new development and growth on transit-served corridors
3. Expand transit marketing and promotion
4. Expand low GHG options

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

The following strategies should be implemented

1. Improve transit service and expand transit infrastructure (rail, bus)
    a. Planning:
        i. Coordinate Rideshare, Transit, Park and Ride, Bike-Pedestrian and inter-state transportation planning and investment at the state, regional and municipal levels
        ii. Prioritize regional routes for expansion based on MDOT data
    b. Capital/ Infrastructure:
        i. Improve Park and Ride Lots by expanding construction of well-lighted and police patrolled parking
        ii. Increase multi-modal hubs (terminals/shelters)
        iii. Technology improvements (real-time customer information)
        iv. Expansion of Operations and Maintenance facilities (transit bases)
        v. Pedestrian, bicycle, and bus stop accessibility and safety projects

c. Operating

i. Improve access within and between centers

ii. Provide new service for developing areas

iii. Provide assistance to rural areas

iv. Increase resources available to elderly and disabled populations (paratransit), and

v. Coordinate schedules of transit services

vi. Improve transit times using transportation management systems (signal prioritization) and/or HOV lanes

2. Focus new development and growth on transit-served corridors
3. Expand transit marketing and promotion

d. Develop and fund marketing strategies promoting alternative modes

e. Provide incentives and/or fund guaranteed ride home programs

f. Provide incentives and/or fund association/network for transit/transportation coordination/management

g. Provide incentives to employers and individuals who encourage or use rideshare, van pools transit, and other alternative modes

h. Provide employer education and technical assistance, especially for large employers

Related Policies/Programs in Place

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Types(s) of GHG Reductions

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-4 Low Greenhouse Gas Fuel Standard

Policy Description

A low greenhouse gas fuel standard (LGFS) would create a market-based program to reduce the GHG emissions from transport fuels and diversify transport fuel options for consumers.

The LGFS is not designed to be biased toward any particular fuel: it would include fossil and renewable fuels. Instead, the LGFS is designed to require fuel providers to reduce the greenhouse gas (GHG) intensity of the fuels they sell in Maryland. "Fuel providers" are identified as producers, importers, refiners, and blenders.

The LGFS is not a tailpipe standard for GHGs. The LGFS considers GHG emissions on a full fuel cycle basis, which includes not only tailpipe emissions, but also emissions associated with the production and distribution of fuels (Well to Wheels). This will result in varying carbon impact values for fuels that would otherwise look the same to customers.[1] The extent of GHG emission reduction will be greater if regional implementation can be coordinated.

Policy Design

Goals: Implement policy that reduces the average carbon intensity of on-road transportation fuel 10 % by 2020.

Timing: TBD

Parties Involved: All layers of government, fuel providers

Implementation Mechanisms

1. Partnership with the Department of Transportation to create the framework for the LCFS.
2. Market-based mechanisms for fuel providers to choose how they wish to meet LGFS.
3. Full life cycle basis of measuring GHG impact of transportation fuels. Implemented by a cap and trade system for fuel providers.
4. Financial incentives for refueling station creation and retrofitting based on LGFS.
5. Certification process
6. To the extent practicable, harmonize with CA Low Carbon Fuel Standard (LCFS)

Related Policies/Programs in Place

Maryland requires that at least 50 percent of State vehicles must use a minimum biodiesel blend of B5 beginning in fiscal year 2008.

[1] For example, how ethanol is made affects its life-cycle GHG profile substantially.

Types(s) of GHG Reductions

All GHG types in the fuel life cycle.

Estimated GHG Reductions and Net Costs or Cost Savings

	MMt CO_2e		
	2005	**2015**	**2020**
No action-trend (Light-duty + heavy-duty)	23.94 + 5.89 = 29.83	26.97 + 7.91 = 34.88	28.78 + 9.18 = 37.96
CA LCFS – 10% by 2020			34.16
Reduction			3.8

Under the LCFS, fuel providers would be required to track the global warming intensity (GWI) of their products, measured on a per-unit-energy basis, and reduce this value over time. Global warming intensity is a measure of all of the mechanisms that affect global climate including not only GHGs, but also processes (like land use changes that may result from biofuel production). The term life cycle refers to all of the activities included in the production, transport, and storage and use of fuel. The unit of measure for GWI used in this study is CO_2e per mega joule of fuel delivered to the vehicle (g CO_2e/MJ) and adjusted for inherent differences in the in-use efficiency of different fuels (e.g., diesel, electricity, and hydrogen).

The table below summarizes the light-duty vehicle scenarios that were evaluated in the CA low carbon fuel standard study. This table compares the baseline scenario of continuing use of existing fuel and vehicle technologies with various fuel and vehicle innovations. While the LCFS could be met, in part, by vehicle technology innovations, it is suggested that the scenarios of most interest to MD should be the two labeled: (1) existing vehicles with advanced biofuels, and (2) biofuel intensive. For these two scenarios, D10 and G10 represent the 10 percent reduction goal.

The D10 scenario includes two types of advanced biofuels for light-duty vehicles, low GHG biofuel blends with gasoline and low GHG Fischer-Tropsch (FT) diesel blends. This scenario minimizes changes to the fuel delivery infrastructure, including the equipment to ship biofuels into and within the State and at retail stations. This scenario avoids the use of E85. Attaining a 10 percent AFCI reduction by 2020 requires some biofuels with performance better than the identified low GHG fuels (cellulosic ethanol from switch grass or Midwest prairie grass). Unfortunately, these are controversial, and it is not clear that such fuels are technically feasible. An alternative is to increase the fraction of biofuel blended with gasoline.

The G10 scenario is designed to explore potential outcomes that require as little fuel and vehicle innovation as possible, and instead rely mostly on large volumes of mid-GHG biofuels in both low blends (10 percent by volume in gasoline and 10 percent bio/renewable diesel) and high blends (85 percent volume in gasoline).

Light-duty Vehicle Scenario Names, Descriptions, and AFCI Goals

Scenario Name	Fuel Innovations	Vehicle Innovations			
			-5%	-10%	-15%
Baseline	Current technologies	Gasoline ICE dominates Increased diesel, HEVs	A*		
Electric Drive	Electric charging & H2 refueling	Significant innovation in PHEV, EV, and FCV technologies	C5	**	**
Existing Vehicles with Advanced Biofuels	Significant biofuel innovation Low-GHG biofuels (5.7% vol.) Low-GHG FT diesel blends	None required	D5	D10	**
Evolving Biofuels and Advanced Batteries	No fuel innovation Mid-GHG biofuels (10% vol.) Mid-GHG biodiesel blends	Advances in PHEV, EV, and FCV technologies.	F5	F10	**
Biofuel Intensive	No fuel innovation Mid-GHG biofuels (10%, 85%) Mid-GHG biodiesel blends Low-GHG fuels for G15	None required	G5	G10	G15
Multiple Fuels & Vehicles	Low-GHG biofuels (10%, /85%) Low-GHG FT diesel blends Electric charging & H2 refueling	Advances in PHEV, EV, and FCV technologies	H5	H10	H15
Heavy Duty Compliance	(to be determined)	(to be determined)			

NOTES: *No AFCI goal applies; **Not considered.
No "B" or "E" scenarios are used to avoid confusion with biodiesel and ethanol blends.
In the "No fuel innovation" scenarios, investment is needed to increase the use of current technologies, but no new technologies are assumed. Biofuel scenarios that assume energy crop production for mid-GHG ethanol (F and G scenarios) have large uncertainties due to feedstock production. See Section 2.4.

The incremental cost of biodiesel is 20 cents per gallon above the cost of petroleum diesel. MD 2020 on-road diesel usage is expected to be 837 million gallons. If 20 percent of the petroleum diesel gallons are replaced with biodiesel, then the added consumer cost in MD during 2020 is $33.5 million. Diesel CO_2 emission reductions in a 10 percent reduction scenario are 0.998 million metric tons. The cost effectiveness of these diesel emission reductions are $33.5 dollars per metric ton CO_2e.

Based on 2007 U.S. prices, the cost per gallon for gasoline is $3.03 per gallon while the cost for ethanol as E85 is $3.71 (to get the energy equivalent of a gallon of gasoline). The gasoline cost analysis reviewed the 2020 gallons of gasoline equivalent projections of light-duty vehicle fuel use by fuel type for the D10 and G10 scenarios in California. The G10 scenario was ultimately used for this cost analysis because it included the largest penetration of E85. The CA analysis showed a 14 percent statewide reduction in gasoline usage, with most of these gallons replaced with either E85 or an ethanol blend. A 14 percent reduction in 2020 gasoline gallons in MD is 376 million gallons. The cost of achieving this gasoline displacement is $255 million at a 68 cent price differential per gallon. A 10 percent reduction in gasoline-associated carbon is estimated to yield a 2.878 million metric ton reduction in CO_2e. The associated cost effectiveness is $88.6 per metric ton.

- **Data Sources:** Based on the University of California report on a low carbon fuel standard for California.
- **Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

There is considerable uncertainty in the future price of gasoline and petroleum diesel as well as the lower carbon alternatives to these transportation fuels.

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-5 Intercity Travel: Aviation, High Speed Rail, Bus

Policy Description

Provide transportation infrastructure between cities to create connectivity of non-auto transportation modes. Rail transport is one of the most energy efficient means to move people and freight over commonly traveled routes on land. High-speed rail can offer a energy efficient alternative to short-range air travel. Movement of passengers and freight by an efficient rail system decreases overall greenhouse gas emissions by 2-4 times as compared to movement by highway. As such, intercity rail express train passenger services covering longer distances than commuter trains can reduce automobile use and possibly aircraft activity. Increased rail capacity could also allow shifting more freight from trucks to rail.

Technology-based improvements, such as anti-idle devices and more efficient engines, will reduce direct emissions from the locomotives operating on the rail network. A robust and efficient rail network using modern, efficient technology is a cornerstone for sustaining Maryland's thriving economy under future carbon emission constraints while providing many social, economic, and environmental benefits.

Policy Design

Goals:

Reduce transportation sector GHG emissions from intercity travel by making passenger and freight rail more accessible, efficient and available. This would be a contributor toward meeting the VMT per capita reduction goal by 2020 via:

1. Building capacity of express rail and bus by expanding and/or improve current passenger and freight rail as needed,
2. Standardize the use of anti-idle equipment and best practices for locomotives,
3. Marketing of new and/or improved/expanded services, and
4. Shift short and mid-distance air travel to high speed rail.

- **Timing:**
- **Parties Involved:** public & private
- **Other:** capacity constraints through the Baltimore area that restrict use of double stack rail cars that are capacity-limiting.

Implementation Mechanisms

Implementation details include:

1. Building capacity of express rail and bus by expanding and/or improve current passenger and freight rail as needed
    a. Planning:

i. Work with municipalities to plan and regulate land use to accommodate rail and bus infrastructure and service.

b. Capital/Infrastructure:

i. Improve rail infrastructure to serve all freight needs (double-stack, etc)

ii. Provide adequate inter-modal (transit, bike, pedestrian, shuttle bus, etc) connections at all railroad stations, airports, and bus stops.

iii. Indentify and provide necessary freight modal transfer stations throughout Maryland.

c. Operating:

i. Improve the frequency of service and travel time of current express train and bus routes

ii. Extend service to underserved cities and regions of Maryland, if and as warranted by demand analysis

2. Standardize the use of anti-idle equipment and best practices for locomotives

a. Increase the number of modern, more fuel efficient locomotives in service (e.g. Diesel Multiple Units)

b. Develop electrified rail support systems and hybrid or fully-electric locomotives.

3. Marketing of new and/or improved/expanded services

a. Target improved railroad station and airport inter-modal connections to large institutions and companies and the Maryland travel industry

Related Policies/Programs in Place

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Types(s) of GHG Reductions

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-6 Pay-as-you-Drive Insurance

Policy Description

Pay-As-You-Drive (PAYD) pricing converts a portion of insurance to a variable cost with respect to vehicle travel, so premiums are directly related to mileage. PAYD makes insurance more actuarially accurate and allows motorists to save money when they reduce their mileage. The less you drive the more you save.

Policy Design

Goals:

PAYD coverage to 10% of MD drivers by 2012 and 80% by 2020 by implementing the following:

1. Conducting a review of possibilities, and
2. Initiating state-sponsored pilot programs
3. Phasing in a requirement that carriers offer PAYD as part of their MD product choices.

- **Timing:**
- **Parties Involved:** Insurance Commissioner, insurance companies
- **Other:** ensure that policy pays attention to equity

Implementation Mechanisms

Implementation details include:

1. Conducting a review of possibilities
    a. Payment mechanism possibilities:
        i. Insurance type:
            1. Discrete premium levels –premiums are set within specific ranges for mileage driven.
            2. Pay by the mile –using a linear rate that does not change as mileage increases
            3. Pay by the mile –using a non-linear rate that increases as mileage increases. This payment scheme must be carefully developed to insure that when a person is faced with the choice of using 2 vehicles to make a trip that the logical and cost effective choice is the most fuel efficient vehicle.
        ii. Fixed up front with a re-imbursement (or additional payment) at the end of the policy period.

1. Shorter policy periods (1 month instead of 6-12 month period). Billed in a manner similar to utility.
2. Purchase insurance is valid up to a certain mileage, instead of a particular date.
3. Review applicable technologies.

2. Initiating state sponsored pilot programs

Related Policies/Programs in Place

GMAC and On-Star Offers Low-Mileage Discount Rates[2]

Since mid-2004 the General Motors Acceptance Corporation (GMAC) Insurance has offered mileage-based discounts to OnStar subscribers located in certain states. The system automatically reports vehicle odometer reading at the beginning and end of the policy term to verify vehicle mileage. Motorist who drive less than specified annual mileage receive insurance premium discounts of up to 40%:

1-2,500 miles:	40% discount
2,501-5,000 miles:	33% discount
5,001- 7,500:	28% discount
7,501-10,000:	20% discount
10,001-12,500:	11% discount
12,501-15,000:	5% discount
15,001-99,999:	0% discount

Value Pricing Program PAYD Pilot projects [3]

This Federal Highway Administration's Value Pricing Pilot Program is now providing funding for PAYD insurance simulation projects in GA and MA.

Distance Based Program

Progressive Insurance[4] offers distance-based insurance in Oregon, Michigan, and Minnesota. The program uses GPS to track vehicle location and use.

TripSense(SM)

"Safer drivers and people who drive less than average should pay less for auto insurance. That's why we created the revolutionary TripSense(SM) discount program, which measures your actual driving habits and allows you to earn discounts on your insurance by showing us how much, how fast and what times of day you drive. TripSense gives you more control over what you pay for insurance, as your driving habits determine your discount." [5]

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[2] See http://www.onstar.com/us_english/jsp/low_mileage_discount.jsp.

[3] See http://www.fhwa.dot.gov/policy/13-hmpg.htm.

[4] See http://www.progressive.com.

[5] See http://tripsense.progressive.com/about.aspx.

Types(s) of GHG Reductions

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

Estimated GHG Reductions and Net Costs or Cost Savings

Data Sources:

The Arizona Public Research Interest Group (PIRG) Education Fund analyzed the potential GHG savings from a Pay-As-You-Drive (PAYD) automobile insurance policy. The strategy for a PAYD policy analyzed assumes that insurers are required to offer mileage-based insurance for certain elements of vehicle insurance, including collision and liability. The PIRG Education Fund assumes the PAYD policy is required, phased in over time, and that all drivers in Arizona are eventually covered.

To calculate GHG savings, the Arizona Public Research Interest Group Education Fund converted Arizona state automobile collision and liability insurance expenditures to an insurance cost per mile (6.4 cents per mile). If insurance consumers pay 80 % of their collision and liability insurance on a per-mile basis, then drivers would be assessed about a 5.1-cent charge per mile. This per-mile insurance charge would reduce vehicle-miles traveled by about 8 %.[6] (To put this charge in context, at 20 mpg, 5.1 cents/mile = ~$1/gallon of gasoline.)

CCS compared the PIRG Education Fund results for estimated reductions in vehicle miles of travel with other studies of PAYD policies, including those produced by the Economic Policy Institute and Resources for the Future (RFF). CCS found that the AZ PIRG estimates were comparable with other estimates, which ranged from 8 % to 20 %.

Quantification Methods:

- **Impacts:**

  Pilot studies and empirical experience with other marginal costs of use find that PAYD can reduce VMT by between 8% and 20%. If phase in / ramp up, then:

  Apply reductions to LDV VMT only:

  — 2012 reduction = Statewide LDV * 4% reduction

  — 2012-2020 reduction = Statewide LDV * 15% reduction

  — Convert to CO2

- **Net present value / cost effectiveness:**

- The success of the Progressive Insurance pilot in Texas suggests that there is an unmet demand for more choice in auto insurance. If PAYD a) improves and increases consumer

[6] Elizabeth Ridlington and Diane E. Brown, *A Blueprint for Action: Policy Options to Reduce Arizona's Contribution to Global Warming*, Arizona Public Research Interest Group Education Fund, April 2006, pp. 25-26. http://www.arizonapirg.org/AZ.asp?id2=23683. See also: http://www.serconline.org/payd/links.html, which links to a wide variety of PAYD studies and materials.

choice, and b) allows insurance providers to more efficiently align risks and premiums, economic efficiency will increase.

- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-7 VMT budgets

Policy Description

The other TLU options affecting VMT will produce only part of the necessary reductions. VMT budgets set state VMT goals by year, and apportion those to the regional and local levels.

State, regional, and local authorities would work together to maintain and increase personal mobility—not inhibit it—through expanded regional and local multimodal design, tools, and investments.

Policy Design

Goals:

Reduce predicted annual per capita VMT for 2020 to 1990 levels by implementing the following (the 1990 benchmark in Maryland is 8,480 miles traveled per capita based on a 1990 population of 4.78 million and 1990 VMT of 40,540 million miles. The comparable statistics for 2005 are 10,200 miles per capita based on a 2005 population of 5.56 million and 2005 VMT of 56,725 million miles. Thus, to reach the 1990 per capita VMT goal would require a 20 percent reduction from 2005 levels. 2020 projections estimate VMT per capita in Maryland in that year of 11,519. Therefore, the needed VMT per capita reduction in Maryland from 2020 business-as-usual estimates to reach 1990 levels is a 36 percent.):

State to establish a schedule of targets for reducing statewide per capita VMT and work with local governments and regional planning organizations to distribute and then achieve those targets.

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

Following are the details for the policy design above:

1. Develop a statewide plan with targets to reduce annual per capita VMT.
    a. The state should adopt a schedule of statewide per capita VMT reduction targets.
    b. Schedule would include goal to reduce annual per capita VMT from a business as usual projection for 2020 to 1990 levels.
    c. As the per capita VMT reduction plan would be a partnership connecting the state, regional, and local levels, the state should design a plan that consists of both state actions and investments to achieve the targets.

2. Apportion responsibilities of that plan to planning organizations, inclusive of local jurisdictions.
    a. Significant state oversight is anticipated and much of the attainment in per capita VMT reductions is expected to result from complimentary actions considered by the TWG.
    b. State to develop and provide guidance to the local transportation groups with a wide range of tools and best practices in order to reach the identified benchmarks.
    c. Local governments must adopt VMT plans consistent with statewide plans.
3. Develop appropriate enforcement policies to ensure that the plans are followed through with and goals are met.

Related Policies/Programs in Place

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Types(s) of GHG Reductions

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-8 Bike and Pedestrian Infrastructure

Policy Description

Improve, add, and promote sidewalks and bikeways to increase pedestrian and bicycle travel and reduce automobile use. Expansion of bike and pedestrian infrastructure would aid in decreasing the MD per capita VMT. A growing body of research demonstrates that communities with traditional neighborhood design, connected pedestrian and bicycle networks, available transit and a rich mix of uses are strongly correlated with decreased automobile use.[7]

Policy Design

Goals:

Remove two obstacles to providing and benefiting from improved bike and ped infrastructure:

1. Planning for local streets has often prioritized the movement and storage of cars over walking and biking.
2. Local governments do not have sufficient funding resources to maintain basic street infrastructure and invest in biking and walking.

So, increase the bicycle and walking mode share of all trips in Maryland urbanized areas to 15% by 2020 by putting the following policies in place:

1. Build on and implement infrastructure planning and designing tools that support and promote bicycle and pedestrian activity
2. Adopt financial requirements or provide incentives that promote bicycle and pedestrian activities

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

Following details are recommended for the policies mentioned above:

1. Introduce infrastructure planning and designing tools/concepts such as:
    a. A state-wide “Complete Streets” policy.
        i. Complete street policies require that new streets, or streets undergoing major maintenance, be designed to accommodate all users.

[7] See LUTAQH Study. Also Frank L, Pivo G. Impacts of Mixed Use and Density on Utilization of Three Modes of Travel: Single Occupant vehicle, Transit, and Walking. TRB 1995; 1466: 44-52. – Key study supports Healthscape or LUTAQH

ii. Local governments could be required to adopt Complete Street policies for their spending, or provides substantial incentives to localities to do so, e.g. making state transportation grants to localities contingent on project consistency with Complete Street policies.

b. A rewrite of Highway Design Manual to require all new engineering and construction to accommodate safe, convenient movement of bicycles and pedestrians along all non-limited corridors as well as across corridors where these corridors act as barriers unless exceptional circumstances exist.

c. Local land use policies could be mandated to include requirements for shower and bike storage facilities in new buildings and design requirements to promote a pedestrian friendly environment.

d. Add bike storage at transit stations and employers.

2. Financial requirements or incentives that promote bicycle and pedestrian activities include:
   a. Increased funding available for bicycle and pedestrian projects.
      i. Provide grants to localities to develop plans and policies to encourage biking and walking, including public education, safety, engineering, and revisions to local land use policies.

      ii. Provide grants to local governments to identify and study the gaps in their bicycle and pedestrian infrastructure and determine how these gaps can be best filled by street-related improvements as well as those associated with other public right-of-ways (e.g., parks, inter-street links, and specialized structures).

   b. Fund and implement low cost safety solutions that improve conditions for bicycling and walking in maintenance projects like paving projects.

   c. Provide local governments with new taxing authority and more flexibility with gas tax revenues to finance local improvements.

      iii. If these taxes were based on vehicle usage (e.g., miles traveled or fuel used) or vehicle type (weight, EPA mpg), it could provide further incentives for users to choose more efficient vehicles, or shift their trips to less polluting modes.

      iv. The goal would be provide sufficient funding for localities to build out their pedestrian and bicycle networks, invest in inviting streetscapes to accompany new development, and retrofit existing streets to prioritize transit, biking and walking.

      v. Similarly, local transit agencies should be granted additional voter-approved revenue sources

Related Policies/Programs in Place

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Types(s) of GHG Reductions

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-9 Pricing Measures

Policy Description

Roadway tolling can be used to discourage single-occupant automobile use and provide revenue for alternative modes. Congestion pricing, tolls (or other charges) that vary with congestion levels can also be particularly effective at reducing congestion. Various forms of VMT-based user fees can also help to discourage unnecessary automobile use. Roadway pricing revenues can help fund needed highway improvements and help manage system-wide demand. In addition, pricing revenues can be used to fund transit and other transportation alternatives within a corridor or region.

Commuter Choice Programs, Parking management, and Transportation System Management have also been bundled into this policy option.

- Commuter Choice Programs encourage employers to provide options such as telecommuting, transit subsidies, pre-tax transit fare program, parking cash-out, and guaranteed ride-home service in order to reduce automobile commutes. The telecommuting option includes the development and utilization of neighborhood telecommuting centers that offer office-type services in locations close to commuters' residences. As an incentive to develop and provide such services, a tax credit can be offered to companies. Government spending to encourage commuter choice can stimulate a large private-sector match (17 dollars of private incentives per dollar of public incentive, according to one source).
- Automobile use is strongly influenced by the location, supply, and pricing of parking. Local Governments can encourage reduction in automobile use by eliminating minimum parking supply requirements, establishing parking supply caps, encouraging higher parking prices, and other mechanisms. Parking ratios for the maximum number of spaces allowed can be set based on the level of transit service an area has. Smart parking ID systems can help inform drivers of parking availability and reduce excessive circling and searching.
- Transportation system management improves vehicle flow on the roadway system, which can reduce fuel use and GHG emissions. Coordinated operation of the regional transportation network can improve system efficiency, reliability, and safety. Tools to reduce traffic congestion include HOV lanes, roundabouts at intersections, synchronized signals, incident management, variable message signs, and other firms of intelligent transportation systems (ITS).

Policy Design

Goals:

Establish the following pricing measures throughout the State by 2020:

1. Cordon Pricing in appropriate areas,

2. VMT Pricing statewide,
3. Parking Pricing

Additionally, commuter choice programs will focus on

1. Requiring and/or incentivizing employers to provide commuter benefits,
2. Expanding commuter choice by supporting telecommuting centers and working with employers to implement best practices in Transportation Demand Management, and

Transportation system management policies to be implemented in brief are:

1. Active traffic management,
2. Traffic management center(s)
3. Traffic signal synchronization and,
4. Managed lanes

All the TSM policies noted above are described in further detail under implementation mechanisms.

Implementation Mechanisms

Pricing Policy Options for Implementation:

Cordon Pricing

1. Programmatic Details:
    a. Establish a cordon pricing system similar to that used in Stockholm and Oslo where all vehicles other than public transit should be charged a fee when entering the urbanized core of major cities in MD on a principal arterial.
    b. The fee should be collected electronically and vary by time of day, but in peak periods be at least twice the peak period transit fare then in effect.
    c. The phase-in should be by principal arterial based on highest traffic count.
2. Use of Funds: All proceeds should be used to support development of public transit.

VMT Pricing

1. Programmatic Details: Maryland should institute a mileage tax
2. Use of Funds: All proceeds should be used to support development of public transit.

High Occupancy Toll (HOT) Network

1. Programmatic Details:
    a. Establish a network of lanes that allow public transit vehicles, carpools, and SOVs willing to pay a fee, congestion-free travel.

b. The electronically charged toll for use of these HOT lanes would vary by time of day and traffic conditions to ensure free-flowing conditions at posted highway speeds. The network should consist of the existing HOT lanes, any currently proposed HOT lanes, and other highway corridors that exhibit the highest level of traffic congestion and the ability to cost-effectively turn bus-only shoulder lanes into a HOT lane.

c. The HOT network should be phased in over time and completely operational by 2015. The lanes/networks should be phased in based on demand and highest traffic counts.

2. Use of Funds:

   a. Pay back the funding source for monies spent to establish each lane,

   b. Pay all the costs of implementing and administering the toll collection system for that lane, and

   c. The remainder, if any, for the expansion and improvement of transit services within the HOT lane corridor.

Parking Pricing

1. Programmatic Details:

   a. Implement a parking surcharge

   b. Establish mechanisms to encourage the price to be passed on to parkers

   c. Explore creating a lower tax structure for parking spaces dedicated to short-term use

   d. Explore the use and valuation of commercial park license fee (required to operate a parking garage) to reflect the environmental cost of parking to the cities and result in parking operators charging high rates for off-street parking

   e. Ensure that 50% of employers who provide leased parking spaces to employees will offer parking cash-out

   f. Develop or improve tools that can be used to evaluate pricing options

2. Use of Funds: All proceeds should be used to support development of public transit.

Commuter Choice Policy Options for Implementation:

Commuter Benefits and Choice

1. Require and/or incentivize Commuter Benefits

   a. Target program to

      i. all non-rural employers over 200 employees offer Commuter Benefits (CB) programs

ii. All colleges and universities offer Commuter Benefits

iii. All government units offer Commuter Benefits, especially the state of Maryland, and

b. Incentive could be by way of State Tax Credits for Employer-provided Commuter Benefits

2. Expand/ Promote Commuter Choice

a. State establishes a public/private partnership to develop and run telecommuting centers that offer office-type services in locations close to commuters' residences.

b. State establishes best practices in Transportation Demand Management, and assist the following to develop and implement Transportation Demand Management plans:

i. Employers of over 200 employees,

ii. Colleges and Universities, and

iii. State agencies.

TSM Policy Options for Implementation:

1. Active Traffic Management. The real-time variable control of speed, lane movement, and traveler information within a corridor and can improve traffic flow in the corridors where it is applied, including:

a. *Speed Harmonization/Queue Warning/Lane Control* - the ability to smooth traffic flows and speeds as vehicles approach congested areas and reduce the speed of vehicles as they approach queues. In Europe, this strategy has been shown to reduce both primary and secondary accidents, reducing non-recurrent congestion. It has also been found to reduce congestion, queuing, and improve throughput. Speed control allows the highway to continue operating nearer to its highest throughput capacity as volumes increase. Specific performance measure is "increase operating speed for congested areas". Anticipated investment level to achieve it is medium.

b. *Traveler Information and Dynamic Re-Routing* - providing Traveler Information opportunities including travel times and the availability of alternative routes around incidents and congested areas. Dynamic re-routing uses modified destination guide-signs and other traveler information methods to assist drivers through alternative routes. Specific performance measure is "reduction of delay" (time) from one destination to another. Other measures may include how much time it takes to change signals across various jurisdictions/alter signal timing dynamically for city streets. Anticipated investment level to achieve it is medium.

Overall, benefits of Active Traffic Management are reduced overall delay, reduced idling, and fewer secondary accidents which will also reduce delay and idling. Again, anticipated investment level to achieve it is medium.

2. Traffic Management Center(s). Provides centralized data collection, analysis, and real-time management of the transportation system. System management decisions are based on in-road detectors, video monitoring, trend analysis, and incident detection.
    a. Specific performance measures are how quickly problems are identified and responded to and restored to normal, "reduced idling time", and "reduction of secondary accidents".
3. Traffic Signal Synchronization. The timing and operations of the traffic signal operations are synchronized to provide an efficient flow or prioritization of traffic, increasing the efficient operations of the corridor and reducing unwarranted idling at intersections. The system can also provide priority for transit and emergency vehicles.
    a. Specific performance is "reliability". Anticipated investment level to achieve is fairly low, though development of concurrent local jurisdiction support and coordination may raise the cost to medium.
4. Managed Lanes are lane(s) which have special operational characteristics and restrictions that are intended to manage the operations of the lane(s). Management of the facility is typically a combination of physical design, which limits access and regulation, and may include pricing. Examples are:
    a. High Occupancy Vehicle (HOV) lanes – are lane(s) exclusively used by transit, vanpools, and vehicles with a minimum number of occupants (typically a minimum of two or three).
        i. Full funding for the completion of the system is needed.
        ii. In addition, periodic re-examination of the system will allow for improved use by deciding which areas should be maintained at 2+ vehicle capacity vs. other locations that would be better served with 3+ vehicle capacity requirements where demand is high and where further extensions of HOV facilities would best serve the traveling public.
    b. Reversible Express Lanes – Lane(s) that change directions during peak periods to manage peak demand periods.
    c. Direct Access Ramps – Highway ramps which provide direct access to a managed lane. An example is a direct access ramp that links a HOV lane to a park & ride facility.
    d. Ramp Bypass Lane – A lane that provides priority bypass of ramp meters for vehicles.
    e. Truck Only Lanes – a lane(s) exclusively used for trucks.
    f. Transit Only Lane or Bus Ways – a lane(s) exclusively used for transit.
    g. Green Lanes – a lane(s) exclusively for vehicles which meet specified environmental impact levels (this management strategy will require careful study, since our HOV lanes are already at capacity)
    h. Limited Access Highways – are highways with limited access points.
    i. High Occupancy Toll (HOT) or Tolled Express Lane –

i. Discussed in detail under Pricing Policy Options above.

Specific performance measures: It is important to continuously review the definitions of the segments of the system to achieve the greatest travel time reliability without creating undue inefficiencies in the overall network.

Reliability may be more useful measure than "delay", some other measures include "average operating speeds", "person throughput" and "VMT reduction" depending on facility type and improvement. Anticipated investment level to achieve is medium for conversion of existing lanes and high for construction of new lanes.

5. Increase Incident Response opportunities – detection, assistance, and clearing of incidents on the highway so as to assist travelers, increase safety, and reduce non-reoccurring delay caused by incidences.
    a. This strategy is best served on limited access roadways where it is hard for drivers to find an alternative route to their destinations.
    b. However, perhaps expand incidence response activities to high volume and accident prone local streets and major arterials if appropriate.

    Specific performance measures are "response time to the scene", "time needed to clear an incident", "delay", and reduced "idle time". Anticipated investment level to achieve is medium to high.
6. Improve Traveler Information - providing real time and projection of travel conditions and transit information to the public to aid in their decision about how, when, and where to travel.

    Reliability may be a more useful measure than "delay." Other measures include "speed/travel time". Anticipated investment level to achieve is medium to high.

Related Policies/Programs in Place

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Types(s) of GHG Reductions

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:**

ICF Consulting, Analyzing the Effectiveness of Commuter Benefits Programs, Transit Cooperative Research Program Report 107, 2005[8]

ICF Consulting, Strategies for Increasing the Effectiveness of Commuter Benefits Programs, Transit Cooperative Research Program Report 87, 2003.[9]

Quantification Methods:

We could not find a breakdown of Maryland employers by size above 50 employees. We will work with MDE to get the right number. In the meantime, we assume that 32% work in covered employers.

Key Assumptions:

GHG impacts

- After the introduction of a commuter benefits program at covered companies, transit usage increases by 25% in 2015, and 30% in 2025.

> More than half of the surveys reported an increase in transit riders between 10 and 40 percent, and nearly one-quarter reported increases of more than 60 percent. Two surveys—one in San Jose in 1997 and one in Atlanta in 2003—suggest that transit ridership more than doubled after a transit benefits program was implemented.[10]

Costs

The costs of providing commuter benefits at the work place varies widely. Although contributing to employee commute benefit financially produces the largest mode shifts, simply allowing an employee to participate in a pre-tax transit pass deduction actually saves the employer money, and generally produces almost as much mode shift. Employers also save money on parking. In a national survey of employers about why they did or did not offer commuter benefits, the main concern was not cost, but the hassle factor of adding an additional benefit.

At the IRS mileage rate of 49 cents per mile, cost savings to commuters would total…

- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

[8] http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_107.pdf

[9] http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_87.pdf.

[10] ICF Consulting, Analyzing the Effectiveness of Commuter Benefits Programs, p. 43.

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-10 Off-Road Engines/Vehicles

Policy Description

This option addresses marine, rail and other off-road engine and vehicles such as construction equipment.

Policy Design

Goals:

To reduce emissions from off-road engines/vehicles by 15% by 2020 by implementing the following:

1. Provide incentives to increase purchases of fuel-efficient or low GHG vehicles.
2. Increase the use of alternate fuels or low sulfur diesel to reduce GHG emissions.
3. Reduce idling time in locomotive and construction equipment.
4. Initiate marketing and education campaigns to operators of off-road vehicles.
5. Adopt "Green Port Strategy" for Baltimore area port facilities

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

Details for implementing policies include:

1. Provide incentives to increase purchases of fuel-efficient or low GHG vehicles.
    a. Examples of vehicles targeted by program include pure electric, hybrid, plug-in hybrid, and other alternative fuel vehicles
    b. Examples of incentives include
        i. Fees on relatively high emissions/lower fuel economy vehicles.
            1. That is, higher vehicle registration fees can be charged for vehicles that have lower fuel economy, and/or vehicles that use alternative fuels could be charged a lower vehicle registration fee.
            2. Vehicle licensing fees could be based upon vehicle weight, with use of a dollar per vehicle-ton multiplier instead of the present broad categories of vehicle weight.
        ii. Rebates or tax credits on low emissions/higher fuel economy vehicles.

iii. Implement a sliding scale tax that would allow purchasers of low greenhouse gas emitting vehicles to earn a rebate on their vehicle registration or sales tax of up to X%, and purchasers of high greenhouse gas emitting vehicles to be assessed a vehicle registration or additional sales tax of up to X%. The sliding scale could be designed to be revenue-neutral, i.e., such that rebates are offset by fees assessed.

2. Increase the use of alternate fuels or low sulfur diesel to reduce GHG emissions. By increasing the availability and usage of alternative fuels (low carbon fuel) and low sulfur diesel for off-road vehicles, as well as recreational marine usage, there could be a significant reduction in GHG emissions.
3. Reduce idling time in locomotive and construction equipment.
    c. Consider increasing measures to reduce locomotive idling including "auxiliary engines" to help maintain power, as well as "plug in" power receptacles in the proposed train storage yards.
    d. For equipment in construction contracts, there would be clauses that would restrict idling time in construction equipment.
4. Initiate marketing and education campaigns to operators of off-road vehicles.
    e. Providing the operators of off-road vehicles with better operations information and education can lead to a gain in fuel efficiency.
    f. Operators also need to be aware of maintenance issues that cause an increase in pollution and vehicle operating cost. By ensuring vehicles are well maintained, fuel efficiency and emissions benefits can be achieved.
5. Adopt "Green Port Strategy" for Baltimore area port facilities
    g. Introduce less polluting, more energy efficient technologies for vessel dwelling and for land-side cargo handling equipment as part of strategy
    h. Include providing "shore power" at the port sites where applicable and feasible for shipping vessels.
    i. Replace diesel cranes at the Port; consider electrifying, or other methods to reduce GHG emissions, if feasible.

Related Policies/Programs in Place

CMAQ funding can be used for retrofits that reduce idling and associated energy use.

Types(s) of GHG Reductions

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – The table below summarizes transportation sector off road engine/vehicles baseline CO_2e emissions compared with a 15% by 2020 reduction program.

Transportation Sector
Off Road Engines/Vehicles

	MMt CO2e		
	2005	**2015**	**2020**
No action-trend (marine, air, rail, other)	2.69	2.81	2.95
GHG reduction strategy			2.51
Reduction			0.44

This option includes a mix of policies designed to reduce GHG emissions from off-road engines/vehicles. The costs and benefits of each of the individual policies are different.

For example, options like locomotive auxiliary engines and providing shore power at port facilities typically have a cost-effectiveness of zero or a cost savings. However, pursuing these options requires an upfront capital investment to purchase a more efficient engine, and the cost savings results from reduced fuel usage compared with the original equipment. Payback periods for this capital investment typically range from 1 to 5 years.

Costs of alternative fuels strategies for off-road equipment would be expected to be similar to those shown under the cost analysis for TLU-4.

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g., Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

TLU-11 Evaluate the GHG Emissions Impacts of Major Projects

Policy Description

The State will require greenhouse gas evaluation of all transportation and land use relevant state and local, major capital projects.

Note:

The current direction for this Policy is to apply to all major projects not in the current baseline. There was extensive discussion at the most recent TLU TWG meeting about which projects are in the current baseline. It is the TWG's current understanding that the major projects often used as examples in the discussion around this Option—the ICC, BRAC, and an I-95 expansion—are not currently in the baseline. We will be seeking further clarification and direction on this point. In the meantime, the TWG has not changed the draft language presented to the last MWG.

[Policy Design

Goals:

1. Understand the likely impact of the ICC on the Governor's GHG commitment
2. Understand the likely impact of potential alternatives, including transit oriented land use and investment; adding toll lanes and express bus; high occupancy toll (HOT) lanes; and a hybrid transit oriented HOT lane, rail and express bus scenario.

- **Timing:** [TBD, as needed on TWG approval]
- **Parties Involved:** [TBD, as needed on TWG approval]
- **Other:** [As needed]

Implementation Mechanisms

Suggested implementation details include:

1. Understand the likely impact of the ICC
    a. Locate and assess studies that include the likely impact of the ICC on GHG emissions
    b. Conduct a new study if necessary; otherwise present findings to the TLU TWG, the Mitigation Working Group and Maryland's Commission on Climate Change.
    c. If new study is required, commission MDOT to undertake a study and present findings to the Governor under a specified timeline for action.
2. Understand the likely impact of potential alternatives
    a. Locate and assess studies that include the likely impact of potential alternatives

b. Conduct a new study if necessary; otherwise present findings to the TLU TWG, the Mitigation Working Group and Maryland's Commission on Climate Change.

c. If new study is required, commission MDOT to undertake a study and present findings to the Governor under a specified timeline for action.

Related Policies/Programs in Place

A study sponsored by a variety of organizations has compared the likely impact of the ICC on VMT and GHG emissions to alternative transportation infrastructure developments that achieve the same goal of connecting the I-270 and I-95/US 1 transportation corridors. Some of the alternatives considered include transit oriented land use and investment; adding toll lanes and express bus; high occupancy toll (HOT) lanes; and a hybrid transit oriented HOT lane, rail and express bus scenario. The result of this analysis can be used to inform the decision to proceed with the construction of the ICC. Moreover, decision making processes for transportation infrastructure development can be standardized to include an analysis of GHG impact of the proposed development and a gamut of alternatives along the lines of those explored in the analysis of the ICC's impact on the State's GHG emissions.

Types(s) of GHG Reductions

TBD – [CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Reductions and Net Costs or Cost Savings

TBD –

[CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCC/GHG MWG moves to final agreement at Meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCC/GHG MWG Meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCC/GHG MWG]